Kennedy Space Center
Facilities Management Guidance for Mold Remediation

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Change Log

Date	Revision	Description
02/23/2018	A	Revised to implement changes in reference literature and to reflect contract and NASA organizational changes.

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1. Introduction

"Mold" is the common term for multicellular fungi that grow as a mat of intertwined microscopic filaments (hyphae). Because these fungi are found everywhere in the environment, exposure to molds and their spores is normally unavoidable. In recent years, the growth of molds in home, school, and office environments has been cited as the cause of a wide variety of human ailments and disabilities. In some cases mold growth has resulted in the closure of facilities and relocation of personnel.

According to the American College of Occupational and Environmental Medicine, about 10 percent of the population has allergic antibodies to fungal allergens and about 5 percent exhibit symptoms that may be mild but also include allergic asthma or allergic rhinitis (hay fever). A rare, but much more serious condition, hypersensitivity pneumonitis, may follow unusually high exposures to mold spores and dusts.

Some species of fungi are known to be capable of producing chemical substances that are toxic (mycotoxins). While current evidence does not support concerns that human health has been affected by mycotoxins in the home or workplace, serious veterinary and human poisoning (mycotoxicoses) have been documented following ingestion of foods heavily overgrown with molds.

Mold spores will settle and grow wherever there is a source of moisture and food (normally wood and cellulose-containing building materials, but can include adhesives and any other organic substrate). Whatever its cause, when these building materials become water-damaged, the cause of water accumulation must be abated or mold growth will occur.

This document provides Facilities Management and Operations and Maintenance personnel with recommended guidance and practices for remediation of clean-water damage and mold remediation. It is intended for use in development of in-house remediation plans or evaluation of plans submitted by remediation contractors.

2. Moisture Control and Mold Remediation

Moisture problems in building are most commonly associated with leaks in the building envelope, flooding, and condensation. Facility Condition Assessment inspections should identify building envelope problems. Facility managers and tenants should be encouraged to report any of these conditions to the responsible Facility Maintenance organization for prompt action. Facilities Maintenance providers should have a plan and equipment in place to provide immediate response to control the water source and dry out water-damaged material to prevent mold growth. Appendix A provides guidance on water damage cleanup and mold remediation procedures.

Relative humidity should be maintained at levels below 65 percent to inhibit mold growth. Short-term periods of higher humidity would not be expected to result in mold growth. However, condensation could result in water accumulation at much lower relative humidity levels. Relative humidity should be kept low enough to prevent condensation on windows and other surfaces.

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The KSC Environmental Health contractor has specific training, expertise, and equipment to help in identifying leaks and monitoring relative humidity levels. Contact the KSC Environmental Health office for assistance in these areas.

3. Visual Inspection

A visual inspection is the most important initial step in identifying a possible mold problem and in determining remedial strategies. The extent of any water damage and mold growth should be visually assessed and the affected building materials identified. A visual inspection should also include observations of hidden areas where damages may be present, such as crawl spaces, above ceilings, and behind wallboard. Carpet backing and padding, wallpaper, baseboards, insulation, and other materials that are suspected of hiding mold growth should also be assessed.

Ceiling tiles, paper-covered gypsum wallboard, structural wood, and other cellulose-containing surfaces should be given careful attention during a visual inspection. Ventilation systems should be visually checked for damp conditions and/or mold growth on system components such as filters, insulation, and coils/fins, as well as for overall cleanliness.

The KSC Environmental Health contractor has specific training and expertise in this area. Contact the KSC Environmental Health office for assistance in performing a visual inspection of water-damaged areas or building materials.

4. Environmental Sampling

Environmental sampling is not usually necessary to proceed with remediation of visually identified mold growth or water-damaged materials. Decisions about appropriate remediation strategies can generally be made on the basis of a thorough visual inspection. Environmental sampling may be helpful in some cases, such as to confirm the presence of visually identified mold or if the source of perceived indoor mold growth cannot be visually identified.

The KSC Environmental Health contractor has specific training, expertise, equipment, and facilities to collect and analyze environmental samples. Contact the KSC Environmental Health office for assistance with any needed environmental sampling.

5. Worker Training

Training of workers is critical in successfully and safely remediating mold growth. Training topics that should be addressed include:

a. Causes of moisture intrusion and mold growth
b. Health and safety concerns related to mold exposure
c. Engineering controls
d. Containment methods
e. Work practices
f. Physical hazards
g. Chemical hazards
h. Microbial hazards

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i. Use of personal protective equipment (PPE)
j. Building related regulated substances (e.g. asbestos, lead)
k. Other applicable OSHA standards, such as Hazard Communication, Respiratory Protection, and PPE

Trained building maintenance staff or custodial workers may be able to address small-scale mold growth (Reference Table B, Small Scale – Total Affected Surface Area Less Than 10 ft^2). For medium- and large-scale projects trained remediation workers are required.

6. **Mold Remediation**

When mold is found to be present, the Facilities Maintenance provider should develop a plan for remediation in coordination with the KSC Environmental Health contractor. The methods used for mold remediation depend on the type of material and the extent of the area with mold growth. Since remediation may include removal of mold-contaminated materials, the remediation plan must include provisions for preventing the spread of dust and spores to other areas of the building, and ensure the protection of those performing the work. Appendix B provides guidance on small isolated areas that are less than 10 square feet (ft^2), such as ceiling tiles and small areas on walls; medium-sized isolated areas of 10–100 ft^2, such as several wallboard panels; and large areas greater than 100 ft^2 in contiguous area (entire wall surfaces), remediation projects, and remediation of Heating, Ventilation, and Air Conditioning (HVAC) systems.

7. Remediation Procedures

The purpose of the mold remediation is to remove or clean mold-contaminated materials in such a way as to prevent dust that contains mold spores and fragments from leaving the work area and entering an occupied space, while protecting the health of workers performing the abatement.

The attached appendices provide generally recognized remediation procedures and containment guidance that should be documented in a written, task-specific work plan that is coordinated with the applicable Environmental Health/Safety office.

Prior to any remediation, consideration must be given to the potential presence of other environmental hazards, such as asbestos and lead. These guidelines are based on possible health risks from mold exposure and may be superseded by standard procedures for the remediation of other indoor environmental hazards.

While work practices and plans for remediation will vary, some general principles do apply. Nonporous (glass, metal, plastic) and semiporous (wood, concrete) materials that are visibly moldy but structurally sound can be cleaned and reused. Cleaning should be done with a soap or detergent solution. Use the gentlest cleaning method that effectively removes the mold to limit dust generation. Porous materials, (such as ceiling tiles, insulation, and wallboard with more than a small area of contamination) should be removed and discarded. Porous materials that can be cleaned (e.g. wallboard, fabrics) can be reused, but should be discarded if possible. Wallboard should be cleaned or removed at least six (6) inches beyond visually assessed mold growth or wet or water-damaged areas. All materials to be reused should be dry and

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visibly free from mold. Consideration should be given to cleaning surfaces and materials adjacent to areas of mold growth for settled spores and fungal fragments. A vacuum equipped with a High Efficiency Particulate Air (HEPA) filter can also be used to clean these adjacent areas. Porous materials that can be laundered (clothing, some fabric coverings) can be cleaned and reused.

Disinfectants are seldom needed to perform an effective remediation because removal of fungal growth remains the most effective means to prevent exposure. Disinfectant use is recommended when addressing certain specific concerns such as mold growth resulting from sewage waters. If disinfectants are necessary, additional measures to protect workers and occupants is also required. Disinfectants must be registered for use by the United States Environmental Protection Agency (EPA). Any antimicrobial used in HVAC systems must be EPA registered specifically for that use.

The use of bleach or other biocides is questionable in most cases. The effectiveness of bleach in reducing living mold is dependent on concentration, residual chlorine levels, and contact time on the surface. Because these factors are difficult to control during remediation, and because removal of mold growth can generally be accomplished by simple cleaning of nonporous surfaces, bleach and other biocides may be no more effective than detergents or other cleaning agents.

The use of gaseous ozone or chlorine dioxide for remediation purposes is prohibited. These compounds are highly toxic and pose a risk both to both applicators and building occupants. Because the effectiveness of these treatments is unproven, the risk of using them is not warranted.

8. Quality Assurance Indicators

Measures to ensure that quality and effectiveness of remediation should be undertaken regardless of the project size. Evaluations should be conducted during as well as after remediation to confirm the effectiveness of remedial work, particularly for large-scale remediation. At a minimum, these quality assurance indicators should be followed and documented:

a. The underlying moisture problem was identified and eliminated
b. Isolation of the work area is appropriate and effective
c. Mold removal and worksite cleanup was performed according to an approved site specific remediation work plan
d. Any additional moisture or mold damage discovered during remediation was addressed
e. Upon completion of remediation, surfaces are free from visible dust and debris
f. If environmental sampling was performed, the results of such sampling were evaluated by a trained environmental health professional and/or the KSC Environmental Health contractor.

9. Restoring Treated Spaces

After completing mold remediation and correcting moisture problems, building materials that were removed should be replaced and brought to an intact and finished condition. The use of new building materials that do not promote mold growth should be considered. Anti-microbial paints are usually unnecessary after

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proper mold remediation. They should not be used in lieu of mold removal and proper moisture control, but may be useful in areas that are reasonably expected to be subject to moisture.

10. Notifications

It is the responsibility of the operator or the responsible construction management organization to notify facility managers of abatement operations. Facility managers are responsible for forwarding notifications of mold abatement to facility tenant management points-of-contact to coordinate outages, employee notifications, and relocations. In addition, construction management personnel should coordinate remediation work with Environmental Health and the Fire Department. Notification should include the estimated start date, work location, project identification (e.g., Work Order Number), a contact name and phone number (Construction Management point-of-contact), and a brief description of work or operation to be conducted.

In addition to the above, placards, signs, or other notices should be posted at the entry to the containment area for the benefit of employees who work in the vicinity of the abatement operation. The posting should identify the type of work in progress and the Project Identification Number and provide the name and phone number of a management representative point-of-contact for project information and for notification in the event of an emergency.

11. References

U.S. Environmental Protection Agency. *Mold Remediation in Schools and Commercial Buildings*, EPA 402-K-01-001, March 2008.

American Society of Heating Refrigeration and Air Conditioning Engineers, Inc. Ventilation for Acceptable Indoor Air Quality – ASHRAE Standard (ANSI/ASHRAE 62.12013). Atlanta, Georgia, 2013.

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American Conference of Governmental Industrial Hygienists (ACGIH): *Bioaerosols: Assessment and Control*, edited by Janet Macher. Cincinnati, OH: ACGIH, 1999.

U.S. Environmental Protection Agency. *Should You Have the Air Ducts in Your Home Cleaned?* EPA-402-K-97-002. October 1997.

American National Standards Institute (ANSI) / Institute of Inspection, Cleaning, and Restoration Certification (IICRC). *ANSI/IICRC S500-2015, Standard and Reference Guide for Professional Water Damage Restoration*, 4th Edition.

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Occupational Safety and Health Administration. *Respiratory Protection Standard, 29 CFR 1910.134*. 63 FR 1152-1300. January 8, 1998.

Occupational Safety and Health Administration, *Hazard Communication Standard, 29 CFR 1910.1200*, 77 FR 17574-17896. May 26, 2012.

Occupational Safety and Health Administration, Personal *Protective Equipment Standard, 29 CFR 1910.132*. 72 FR 64341-64430. November 15, 2007.

American Industrial Hygiene Association, *Report of Microbial Growth Task Force*, AIHA Press, Fairfax, VA, May 2001.

American College of Occupational and Environmental Medicine, *ACOEM Evidence-Based Statement: Adverse Human Health Effects Associated with Molds in the Indoor Environment*, October 27, 2002.

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Appendix A - Water Damage Cleanup and Mold Prevention[1]

Guidance for Response to Clean Water Damage to Prevent Mold Growth[2]	
Water-Damaged Material[3]	**Action**
Books and Papers	• If replaceable, discard • Photocopy papers as needed • Valuable books may be salvaged by freeze drying
Carpet and backing (<48 hrs) [4]	• Remove water with water-extraction vacuum • Use dehumidifiers to reduce ambient humidity levels • Accelerate drying process with fans
Ceiling tiles	• Discard and replace
Insulation (cellulose or fiberglass)	• Discard and replace
Concrete, brick, cinderblock	• Remove standing water • Use dehumidifiers to reduce ambient humidity levels • Accelerate drying process with fans
Flooring (linoleum, vinyl, ceramic tile)	• Remove standing water • Clean with water and detergent and allow to dry • Scrub if necessary • Inspect to ensure underflooring is dry
Nonporous hard surfaces (plastics and metals)	• Clean with water and detergent and allow to dry • Scrub if necessary
Upholstered furniture[5]	• Remove water with water extraction vacuum • Use dehumidifiers to reduce ambient humidity levels • Accelerate drying process with fans
Wallboard (drywall and gypsum board)	• Dry in place if there is no visible swelling and the seams are intact. If not, remove, discard, and replace. • Ventilate wall cavity
Window drapes	• Launder in accordance with manufacturers instructions
Wood surfaces	• Remove moisture and use dehumidifiers to reduce ambient humidity levels • Accelerate drying process with fans • Clean treated or finished wood surfaces with water and mild detergent and allow to dry • Wall paneling should be removed from the wall for drying

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1. From EPA 402-K-01-001: Mold Remediation in Schools and Commercial Buildings
2. If mold growth has occurred or if materials have been wet for more than 48 hours, use Appendix B. Even if materials have dried within 48 hours mold growth may occur. Contact Environmental Health to test items if there is doubt. Note that mold growth will not always occur after 48 hours. This is only a guideline. These guidelines are for damage caused by clean water. For water that is known to be contaminated with sewage, chemical, or other pollutants, additional health and safety precautions may apply. Contact Environmental Health if contamination is known or suspected. Do not use fans until determining the water is clean or sanitary.
3. Contact a restoration/water damage specialist before remediation of items with high monetary/intrinsic value.
4. The subfloor under carpeting or other flooring material must also be cleaned and dried. See the appropriate section of this table for recommended actions for remediation of subfloor materials.
5. Upholstered furniture may be difficult to dry within 48 hours. Valuable items may require consultation with a water damage specialist who specializes in furniture restoration.

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Appendix B - Guidance for the Remediation of Building Materials with Mold Growth Caused by Clean Water

Small Scale – Total Affected Surface Area Less Than 10 ft^2 (1)			
Material or Furnishing Affected	**Cleanup method[2, 3]**	**Personal Protective Equipment (PPE)**	**Containment[5]**
Carpet and backing	• Wet vacuum or steam cleaning[4] • High Energy Particulate Air (HEPA) vacuum after drying	Half-face N-95 respirator, gloves, goggles	None required
Concrete or cinder block	• Wet vacuum • HEPA vacuum after drying		
Flooring (linoleum, vinyl, ceramic tile)	• Wet vacuum • Damp wipe with plan water or water/detergent solution; scrub as needed • HEPA vacuum after drying		
Nonporous hard surfaces (plastics and metals)	• Wet vacuum • Damp wipe with plan water or water/detergent solution; scrub as needed • HEPA vacuum after drying		
Upholstered furniture and drapes	• Wet vacuum or steam cleaning • HEPA vacuum after drying		
Wallboard (drywall and gypsum board)	• HEPA vacuum after drying		
Wood surfaces	• Wet vacuum • Damp wipe with plan water or wood floor cleaner; scrub as needed • HEPA vacuum after drying		
HVAC system[6]	• Remove contaminated insulation, lined ducts, filters • Damp wipe with plan water or water/detergent solution; scrub as needed • HEPA vacuum after drying		

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Medium Scale – Total Affected Surface Area Between 10 ft^2 and 100 ft^2 (1)			
Material or Furnishing Affected	**Cleanup method[2, 3]**	**Personal Protective Equipment**	**Containment[5]**
Carpet and backing	• Wet vacuum or steam cleaning[4] • HEPA vacuum after drying • Discard – Remove materials and seal in plastic before removal from the containment area. Dispose of as normal waste.	Half-face N-95 respirator or full-face respirator with HEPA filter, disposable coveralls, gloves, goggles	Limited containment
Concrete or cinder block	• Wet vacuum • HEPA vacuum after drying		
Flooring (linoleum, vinyl, ceramic tile)	• Wet vacuum • Damp wipe with plan water or water/detergent solution; scrub as needed • HEPA vacuum after drying		
Nonporous hard surfaces (plastics and metals)	• Wet vacuum • Damp wipe with plan water or water/detergent solution; scrub as needed • HEPA vacuum after drying		
Upholstered furniture and drapes	• Wet vacuum or steam cleaning • HEPA vacuum after drying • Discard – Remove materials and seal in plastic before removal from the containment area. Dispose of as normal waste.		
Wallboard (drywall and gypsum board)	• HEPA vacuum after drying • Discard – Remove materials and seal in plastic before removal from the containment area. Dispose of as normal waste.		
Wood surfaces	• Wet vacuum • Damp wipe with plan water or wood floor cleaner; scrub as needed • HEPA vacuum after drying		
HVAC System[6]	• Remove contaminated insulation, lined ducts, filters • Damp wipe with plan water or water/detergent solution; scrub as needed • HEPA vacuum after drying		

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Large Scale – Total Affected Surface Area Greater Than 100 ft^2 or Significant Potential for Occupant or Remediated Exposure During Remediation[1]			
Material or Furnishing Affected	**Cleanup method[2,3]**	**Personal Protective Equipment**	**Containment[5]**
Carpet and backing	• Wet vacuum or steam cleaning[4] • HEPA vacuum after drying • Discard – Remove materials and seal in plastic before removal from the containment area. Dispose of as normal waste.	Half-face N-95 respirator or full-face respirator with HEPA filter, disposable coveralls, gloves, goggles	Full containment
Concrete or cinder block	• Wet vacuum • HEPA vacuum after drying		
Flooring (linoleum, vinyl, ceramic tile)	• Wet vacuum • Damp wipe with plan water or water/detergent solution; scrub as needed • HEPA vacuum after drying • Discard – remove materials and seal in plastic before removal from the containment area. Dispose of as normal waste.		
Nonporous hard surfaces (plastics and metals)	• Wet vacuum • Damp wipe with plan water or water/detergent solution; scrub as needed • HEPA vacuum after drying		
Upholstered furniture and drapes	• Wet vacuum or steam cleaning • HEPA vacuum after drying • Discard – Remove materials and seal in plastic before removal from the containment area. Dispose of as normal waste.		
Wallboard (drywall and gypsum board)	• HEPA vacuum after drying • Discard – Remove materials and seal in plastic before removal from the containment area. Dispose of as normal waste.		
Wood surfaces	• Wet vacuum • Damp wipe with plan water or wood floor cleaner; scrub as needed		

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	• HEPA vacuum after drying • Discard – Remove materials and seal in plastic before removal from the containment area. Dispose of as normal waste.		
HVAC Systems[6]	• Remove contaminated insulation, lined ducts, filters • Damp wipe with plan water or water/detergent solution; scrub as needed • HEPA vacuum after drying		

1. Coordinate with Environmental Health to determine appropriate levels of PPE and containment on a case-by-case basis, particularly as the size of the affected area and the potential for exposure increases. Required PPE may be affected by use of chemical cleaners. Reassess PPE requirements if the extent of contamination encountered is greater than expected or if the water source is contaminated with sewage or other pollutants.
2. Select the method most appropriate to the situation. Some items may be damaged such that cleaning will not restore their original appearance.
3. Dust suppression methods such as misting (not soaking) surfaces prior to remediation are recommended.
4. Some mold spores/fragments will remain but will not grow if the material is completely dried.
5. Vacating people from the spaces adjacent to the work area is recommended for people recovering from recent surgery, immune suppressed people, or people with chronic inflammatory lung diseases (e.g. asthma, hypersensitivity pneumonitis, severe allergies). Refer to Appendix D for Containment Guidance.
6. HVAC system should be shut down prior to any remediation activities.

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Appendix C - Personal Protective Equipment

Skin and Eye Protection

Gloves are required when handling mold-contaminated materials and when using irritant cleaning solutions. Long gloves that extend to the middle of the forearm are recommended. Tear-resistant natural rubber, neoprene, nitrile, polyurethane, or polyvinyl chloride gloves may be used. Avoid use of latex gloves.

Eye protection must be selected to protect the eyes from dust and splashes from cleaning solutions. Goggles of a full-face respirator provide appropriate eye protection. Do not use safety glasses, face shields, or goggles with open vent holes.

Respiratory Protection

Respiratory protection is required for use by remediation workers to prevent inhalation of mold spores/fragments and dusts associated with the remediation activity. Respirator use must be compliant with the requirements of OSHA (29 CFR 1910.134) and the KSC Respiratory Protection Program (KNPR 1820.4).

Protective Clothing

Disposable protective clothing is required for medium- and large-scale remediation projects to prevent soiling of work clothing and to prevent skin contact with mold-contaminated dusts. Protective clothing may be selected from disposable paper or Tyvek® (or equivalent) coveralls with wrists and ankles taped. Disposable hoods and foot covering may be selected where unusually dusty/dirty conditions exist.

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Appendix D - Containment Guidance

The purpose of containment during remediation activities is to limit the dispersion of mold into the air and surroundings in order to limit the exposure of remediators and building occupants.

Two containment options are referenced in Appendix B. The larger the area of contaminated material, the greater the possibility of occupant exposure and the greater the need for containment. While the area of contamination is used as a rule for selecting the type of containment, some professional judgment is required. Consider that a heavy growth of mold in a small area could release more mold spores during remediation than a large area of light mold growth and as a result, may require a higher level of containment.

No containment (<10 ft^2)

Small areas, such as ceiling tiles, and small water-damaged areas of wallboard can be safely remediated without using containment. However, when encountering heavy growth consideration should be given to use of a limited containment. Custodial staff that has received basic Hazard Communication and personal protective equipment (PPE) training may perform this work. The work area should be unoccupied. Any mold-contaminated debris must be bagged or wrapped in plastic following removal. Vacating adjacent work spaces is not necessary, but is recommended for infants under 12 months and persons who are recovering from recent surgery, immune suppressed individuals, and persons with severe allergies, asthma, hypersensitivity pneumonitis, and other chronic inflammatory lung diseases.

While containment is not necessary, dust suppression methods, such as misting (not soaking) surfaces prior to and during remediation are recommended.

Following the remediation, the work area and surrounding areas should be high efficiency particulate air (HEPA) vacuumed and cleaned with a damp cloth/mop and a detergent solution before reoccupying the space.

Limited Containment (10–100 ft^2)

Moderately sized areas of mold growth can be safely remediated using limited containment. However, when encountering heavy growth, consideration should be given to use of full containment. For limited containment, facilities maintenance staff that has received training on the use of required PPE and cleaning methods and related hazards may perform this work. The work area and areas directly adjacent to the work area should be unoccupied. Vacating adjacent work spaces is recommended for infants less than 12 months and persons who are recovering from recent surgery, immune suppressed individuals, and persons with severe allergies, asthma, hypersensitivity pneumonitis, and other chronic inflammatory lung diseases.

Shut down the appropriate heating, ventilation, and air conditioning (HVAC) system prior to beginning work. The containment enclosure should consist of a single layer of 6-mil fire retardant polyethylene sheeting. The containment should have a slit entry and covering flap on the outside of the entry. For smaller areas, the polyethylene sheeting can be affixed to floors and ceilings with duct tape. For larger areas, a steel or wooded

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stud frame can be erected and polyethylene sheeting attached to it. All HVAC supply and return vents, doors, chases, and risers within the containment area must be sealed with sheeting to minimize the migration of dust to adjacent areas. If the remediation involves removal or cleaning of contaminated HVAC system components, isolate the HVAC system using double layers of polyethylene plastic sheeting sealed with duct tape (include ducts/grills, fixtures, and any other openings).

Heavy growth of mold on ceiling tiles used as a return air plenum requires installation of containment from the floor to the ceiling deck and the filters on the air-handling units serving the affected area may have to be replaced when work is complete.

The containment area must be maintained under a negative pressure relative to the occupied space using HEPA filtered fan units that exhaust to the exterior of the building at a location away from building entries and air intakes. For small, easily contained areas an exhaust fan ducted to an exterior location can be used.

The surfaces of all objects being removed from the containment area should be cleaned prior to removal. Any mold-contaminated debris must be bagged or wrapped in plastic before removal from the containment. The remediation guidance described in Appendix B should not begin until the containment is properly sealed and a negative pressure is established.

All work areas should be left dry and visibly free from contamination and debris before removing the containment. Following the remediation, the work area and surrounding areas should be HEPA vacuumed and cleaned with a damp cloth/mop and a detergent solution before reoccupying the space.

Full Containment (>100 ft^2 or as required to prevent contamination of occupied areas)

Facilities maintenance staff that has received training on the use of required PPE and cleaning methods and related hazards may perform this work. The work area and areas directly adjacent to the work area should be unoccupied. Vacating adjacent work spaces is recommended for infants less than 12 months and persons who are recovering from recent surgery, immune suppressed individuals, and persons with severe allergies, asthma, hypersensitivity pneumonitis, and other chronic inflammatory lung diseases.

Shut down the appropriate HVAC system(s) prior to beginning work. Full containment requires application of a double layer of polyethylene to create a barrier between the mold-contaminated area and occupied parts of the building. All HVAC supply and return vents, doors, chases, and risers within the containment area must be sealed with sheeting to minimize the migration of dust to adjacent areas. If the remediation involves removal or cleaning of contaminated HVAC system components, isolate the HVAC system using double layers of polyethylene plastic sheeting sealed with duct tape (include ducts/grills, fixtures, and any other openings). Heavy growth of mold on ceiling tiles used as a return air plenum requires installation of containment from the floor to the ceiling deck and the filters on the air-handling units serving the affected area may have to be replaced when work is complete.

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A decontamination room and airlock should be constructed for entry into the space. The entry to the airlock from the outside and from the airlock to the main containment area should consist of a slit entry with covering flaps on the outside surface of each entry. The chambers should be large enough to accommodate waste containers and to don/doff PPE. An additional airlock may be constructed for staging of construction equipment and waste materials. When exiting the airlock, all contaminated PPE, with the exception of respirators, should be removed and placed in a waste receptacle. The respirator should not be removed until outside the airlock.

PPE must be worn through all stages of remediation through final vacuuming and wet wiping of the work area and during HEPA vacuum filter changes or cleaning of the HEPA vacuum and other contaminated tools/equipment.

The contained area and decontamination/equipment rooms should be HEPA vacuumed and cleaned with a damp cloth/mop with a detergent solution and be visibly clean prior to removal of the containment.

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